located in those regions. In 1886 three energetic storms traversed the Gulf of Mexico, the first of which moved north and northeast over the west Gulf during the 13th and 14th, attended by destructive gales along the west Gulf coast; from the 19th to 21st a depression moved from the western part of the Caribbean Sea northward over western Florida, attended by heavy rain in Cuba and dangerous gales over the eastern Gulf; and from the 27th to 30th a depression moved from the Caribbean Sea, near Jamaica, over northeastern Yucatan and thence recurved north and northeast over the Gulf to northern Florida, attended by severe gales and heavy rain. In 1889 a depression which originated over the western Caribbean sea moved northward between Cuba and Yucatan and recurved northeast over Florida from the 15th to 17th, accompanied by heavy rain and high winds. The most destructive storm noted for June over the western part of the north Atlantic ocean in recent years moved eastward from the New Jersey coast on June 5, 1885, and thence passed eastward to the Grand Banks by the 7th. This storm was considered the most disastrous that had visited the Newfoundland coast in forty years, and it was estimated that more than fifty vessels were totally wrecked, while a large number were driven ashore and more or less damaged.

OCEAN ICE IN JUNE.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for June, during the last eight years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
June, 1883	40 28	51 45	June, 1883	48 14	42 43
June, 1884	40 42	47 49	June, 1884	44 00	45 23
June, 1885	39 38	48 12	June, 1885	45 14	41 12
June, 1886	40 30	53 00	June, 1886	49 15	40 00
June, 1887	40 40	48 34	June, 1887	43 22	39 19
June, 1888	43 38	43 24	June, 1888	43 38	43 24
June, 1889	42 54	49 54	June, 1889	46 57	40 29
June, 1890	40 01	52 00	June, 1890*	46 08	37 07

*On the 10th a small block of ice was reported in N. 46° 28′, W. 28° 34′.

The above table shows that for June, 1890, ice was reported about one and one-half degree south and nearly three and one-half degrees east of the average southern and eastern limits of Arctic ice for the corresponding month of the last seven years. The southernmost ice reported was a small iceberg on the 16th, and the easternmost ice reported was a medium-sized iceberg on the 3d, in the positions given. As shown by the note under the table a block of ice was reported about eight and one-half degrees farther east than the easternmost iceberg noted. In but one year, 1885, has ice been reported farther south, and the easternmost iceberg reported for the current month was more than two degrees farther east than the easternmost ice reported for June of preceding years, and in but one preceding year, 1887, has Arctic ice been reported east of the fortieth meridian. As regards quantity, the ice reported for the current month was largely in excess of the average for June of preceding years. From the 17th to the 20th a vessel effected the passage of the Straits of Belle Isle, and the captain reports that for thirty miles east of Belle Isle large icebergs and field ice were observed, and that thirty hours were required to make the passage from Cape Norman to Greenlet Island on account of the straits being blocked with ice. On the 29th numerous icebergs were reported from thirty miles east-northeast of Belle Isle to the Straits of Belle Isle, also a large patch of detached ice twelve miles east of Belle Isle; from Belle Isle to Point Amour there were numerous large icebergs thickly packed with small pieces of ice; and icebergs were observed one hundred and twenty-six miles from Point Amour on a course to Heath Point, Anticosti Island.

FOG IN JUNE.

The limits of fog belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on sixteen dates; between the fifty-fifth and sixty-fifth meridians on fifteen dates; and west of the sixty-fifth meridian on nine dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Grand Banks numbered five less than the average; between the fifty-fifth and sixty-fifth meridians the same as the average; and west of the sixty-fifth meridian seven less than the average. On all dates for which fog was reported near the Banks of Newfoundland it was noted in the eastern quadrants of areas of low pressure advancing from the westward. With the exception of the 4th and 5th, when falling barometer, threatening weather, and rain prevailed in that region, the fog reported between the fifty-fifth and sixty-fifth meridians attended the approach or passage to the northward of areas of low pressure. West of the sixty-fifth meridian fog occurred with the approach or passage of areas of low pressure, save on the 5th, when falling barometer and threatening weather prevailed in that region. The reports of Signal Service observers show that on the 4th dense fog prevailed on the Massachusetts coast with southeast wind and rain; on the 5th on the Connecticut and Rhode Island coasts with southeast wind and rain; on the 6th at New York City with a low pressure storm in the Saint Lawrence Valley; on the 7th and 12th on the Massachusetts, Rhode Island, and New York coasts with low pressure storms in the Saint Lawrence Valley; on the 13th, 14th, and 18th along the southern New England coast with low pressure storms in the Saint Lawrence Valley; on the 19th on the coast of eastern Maine with a low pressure storm over Nova Scotia; on the 24th from Maine to New Jersey with a low pressure storm in the Saint Lawrence Valley; and on the 25th on the coasts of Rhode Island and New York with a low pressure storm in the Saint Lawrence Valley.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for June, 1890, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

For June, 1890, the mean temperature was highest over southwestern Arizona and the adjoining part of California, where it was above 85°, and the mean values were generally above 80° in the Atlantic coast states south of the thirty-fifth parallel, and south of a line traced irregularly westward over the Gulf States to the middle Rio Grande valley. The mean temperature was also above 80° from southwestern Arizona and southeastern California northward over southern Nevada. The mean temperature was lowest at the more elevated stations in west-central Colorado and in extreme northwestern Washington, where it was below 50°, and the mean readings were below 60° in the Canadian Maritime Provinces, Maine, extreme northern Michigan, northeastern Minnesota, from western Montana southeastward to south-central Colorado and southwestward to west-central Nevada, in central Nevada, and

southwestern Utah, and at Pacific coast stations from San Francisco, Cal., northward.

Except in New England, the Saint Lawrence Valley, and the Canadian Maritime Provinces the mean temperature was above the normal east of a line traced from the British Possessions north of Montana southeastward to southern Florida, while to the westward of this line the month was cooler than the average June, save at stations on the Pacific coast between the thirty-fifth and forty-fifth parallels. The most marked departures above the normal temperature occurred in the lower valley of the Red River of the North, where they exceeded 5°, and the excesses in temperature exceeded 4° from the upper lake region southward over the lower Ohio and upper Mississippi valleys. The greatest departures below the normal temperature were noted in eastern New Brunswick and Nova Scotia, where they were more than 4°, and the deficiencies in temperature exceeded 3° within an area extending from southwestern Idaho southward to central New Mexico.

The following are some of the most marked departures from the normal at the older established stations:

Above normal.	°	Below normal.	°
Saint Vincent, Minn	6.8	Halifax, N. S.	5.0
Parry Sound, Ont	5.0	Boisé City, Idaho	3.4
Keokuk, Iowa	5.2	San Antonio, Tex	3.6
Augusta, Ga	4.2	Whipple Barracks, Ariz	3.4

At stations in the south Atlantic states, Arkansas, Kansas, the Ohio Valley and Tennessee, the Lake region, and the upper Mississippi and Red River of the North valleys the mean temperature was the highest, while at stations in the northern plateau region and on the north Pacific coast the mean temperature was the lowest reported for June during the respective periods of observation. At Atlanta, Ga., twelve years record, the mean for the current month, 78°.8, was 1°.2 above the highest mean temperature previously reported for June, noted in 1881; Augusta, Ga., twenty years record, 83°.2, 0°.9 above mean of 1881; Charleston, S. C., twenty years record, 82°.2, 0°.5 above mean of 1881; Charlotte, N. C., twelve years record, 80°.2, 1°.3 above mean of 1881; Merritt's Island, Fla., six years record, 83°.4, 2°.4 above mean of 1887; Southport, N. C., fifteen years record, 79°.4, 0°.7 above mean of 1876; Wilmington, N. C., twenty years record, 80°.1, 0°.1 above mean of 1871; Chattanooga, Tenn., twelve years record, 78°.9, 2°.6 above mean of 1881; Wauseon, Ohio, twenty years record, 72°.8, 0°.4 above mean of 1873; Columbus, Ohio, twelve years record, 74°.6, 1°.8 above mean of 1880; North Lewisburgh, Ohio, fifty-eight years record, 77°.5, 3°.5 above mean of 1865; Fort Smith, Ark., nine years record, 78°.3, the same as mean of 1882; Indianapolis, Ind., 76°.7, the same as mean of 1873; Grampian Hills, Pa., twenty-five years record, 70°.0, the same as mean of 1865; Knoxville, Tenn., twenty years record, 77°.5, 1°.1 above mean of 1874; Wellington, Kans., eleven years record, 81°.4, 3°.0 above mean of 1881; Alpena, Mich., eighteen years record, 63°.4, 0°.7 above mean of 1876; Cleveland, Ohio, twenty years record, 70°.4, the same as mean of 1873; Detroit, Mich., twenty years record, 71°.6, 1°.2 above mean of 1884; Escanaba, Mich., twenty years record, 65°.4, 0°.6 above mean of 1880; Grand Haven, Mich., twenty years record, 68°.0, the same as mean of 1884; Milwaukee, Wis., twenty years record, 67°.9, 0°.8 above means of 1873 and 1880; Port Huron, Mich., sixteen years record, 67°.4, 0°.9 above mean of 1880; Sandusky, Ohio, twelve years record, 72°.8, 2°.0 above mean of 1880; Thornville, Mich., thirteen years record, 71°.7, 1°.3 above mean of 1880; Cairo, Ill., nineteen years record, 79°.4, 1°.9 above means of 1873 and 1881; Des Moines, Iowa, twelve years record, 73°.2, 1°.3 above mean of 1887; Dubuque, Iowa, seventeen years record, 73°.6, 1°.2 above mean of 1874; Saint Vincent, Minn., ten years record, 68°.8, 2°.6 above mean of 1884; and Springfield, Ill., eleven years record, 76°.0, 2°.7 above mean of 1880. At Portland, Me., twenty years record, the mean temperature for the current month, 60°.6, was 0°.2 lower than the lowest mean temperature previously reported for June, noted in 1881 and 1886; Boise City, Idaho, thirteen years record, 62°.6, 0°.2 below mean of 1887; Tatoosh Island, Wash., seven years record, 47°.4, 4°.9 below mean of 1887; and Sacramento, Cal., thirty-seven years record of voluntary observers, 64°.4, 1°.2 below mean of 1889.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for June for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for June, 1890; (4) the departure of the current month from the normal; (5) and the extreme monthly means for June, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of June.	(2) Length of record.	(3) Mean for June, 1890.	(4) Departure from normal.	(5) Extreme monthly mean temperature for June. Highest.	Year.	Lowest.	Year.
Arkansas.		°	*Years*	°	°	°		°	
Lead Hill	Boone	76.6	8	80.1	+ 3.5	80.2	1885	74.9	1889
California.									
Sacramento	Sacramento	70.2	37	64.4	— 5.8	77.0	1853	64.4	1890
Connecticut.									
Middletown	Middlesex	66.5	23	66.5	0.0	72.6	1876	62.9	1863
Florida.									
Merritt's Island	Brevard	78.8	8	83.4	+ 4.6	83.4	1890	75.4	1889
Georgia.									
Forsyth	Monroe	76.3	16	81.4	+ 5.1	81.9	1880, '81	74.2	1884
Illinois.									
Peoria	Peoria	73.8	34	78.9	+ 5.1	79.7	1873	69.4	1869
Riley	McHenry	66.7	34	70.0	+ 3.3	73.9	1856	62.1	1862
Indiana.									
Vevay	Switzerland	73.3	24	77.4	+ 4.1	77.9	1867	68.4	1869
Iowa.									
Cresco	Howard	66.0	17	68.6	+ 2.6	72.0	1873	62.8	1877
Monticello	Jones	65.4	36	73.2	+ 7.8	74.0	1856	64.1	1863
Logan	Harrison	69.9	16	72.8	+ 2.9	74.4	1887	64.5	1876
Kansas.									
Lawrence	Douglas	73.5	21	77.0	+ 3.5	77.2	1881	69.8	1879
Wellington	Sumner	73.2	11	81.4	+ 8.2	81.4	1890	65.8	1889
Louisiana.									
Grand Coteau*	Saint Landry	79.6	7	.....	.....	.....	.....	.....	.....
Maine.									
Orono	Penobscot	62.1	20	59.5	— 2.6	64.8	1884, '89	57.5	1881
Maryland.									
Cumberland	Allegany	68.5	30	72.6	+ 4.1	74.0	1874	63.5	1863
Massachusetts.									
Amherst*	Hampshire	66.6	54	.....	.....	.....	.....	.....	.....
Newburyport	Essex	65.2	12	63.2	— 2.0	68.2	1883	59.4	1881
Somerset	Bristol	68.8	18	67.8	— 1.0	72.2	1876	64.3	1881
Michigan.									
Kalamazoo	Kalamazoo	66.8	13	69.0	+ 2.2	70.0	1887	63.7	1889
Thornville	Lapeer	67.4	13	71.7	+ 4.3	71.7	1890	64.1	1881
Minnesota.									
Minneapolis	Hennepin	66.6	25	69.2	+ 2.6	72.0	1873	61.9	1877
Montana.									
Fort Shaw	Lewis & Clarke	62.7	21	60.4	— 2.3	70.6	1871	58.1	1877
New Hampshire.									
Hanover	Grafton	64.0	56	63.5	— 0.5	69.8	1870	57.9	1839
New Jersey.									
Moorestown	Burlington	70.3	27	71.2	+ 0.9	73.8	1865	66.3	1886
South Orange	Essex	69.0	18	69.1	+ 0.1	73.6	1876	63.4	1881
New York.									
Cooperstown	Otsego	64.0	36	65.4	+ 1.4	71.9	1870	57.3	1863
Palermo	Oswego	64.5	36	66.4	+ 1.9	71.6	1870	59.4	1855
North Carolina.									
Lenoir	Caldwell	70.0	18	73.8	+ 3.8	75.0	1874	63.6	1887
Ohio.									
N'th Lewisburgh	Champaign	68.9	58	77.5	+ 8.6	77.5	1890	61.0	1879
Wauseon	Fulton	68.2	20	72.8	+ 4.6	72.8	1890	64.8	1889
Oregon.									
Albany	Linn	61.8	11	63.3	+ 1.5	66.1	1889	59.1	1880
Eola	Polk	59.9	20	58.0	— 1.9	65.0	1889	54.5	1873
Pennsylvania.									
Dyberry	Wayne	64.1	23	64.0	— 0.1	68.2	1870	60.4	1881
Grampian Hills	Clearfield	66.3	25	70.0	+ 3.7	70.0	1865, '90	61.3	1878
Wellsborough	Tioga	66.1	11	64.5	— 1.6	74.6	1883	61.1	1881
South Carolina.									
Statesburgh	Sumter	76.1	9	78.5	+ 2.4	80.5	1881	72.4	1884
Tennessee.									
Austin	Wilson	76.0	19	80.6	+ 4.6	85.5	1874	72.1	1878
Texas.									
New Ulm	Austin	80.2	17	80.4	+ 0.2	85.0	1881	77.4	1889
Vermont.									
Strafford	Orange	66.0	17	63.8	— 2.2	71.1	1884	58.4	1881
Virginia.									
Birdsnest	Northampt'n	74.4	22	76.3	+ 1.9	77.7	1880	70.4	1887
Wisconsin.									
Madison	Dane	67.6	18	70.6	+ 3.0	72.4	1873	62.5	1869
Washington.									
Fort Townsend	Jefferson	59.1	17	56.3	— 2.8	61.7	1888	56.0	1879

*Not received.

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 107° at Yuma, Ariz., on the 7th; the maximum temperature rose to, or above, 100° in the Gila Valley, in the Colorado Valley from southern Nevada southward, from the upper San Joaquin valley southward over southern California, in the middle Sacramento valley, Cal., at Walla Walla, Wash., El Paso, Tex., Rio Grande City, Tex., Fort Sill, Ind. T., Dodge City, Kans., Fort Smith, Ark., and Columbia, Mo.; and the maximum values were generally above 90° south of a line traced from the coast of southern New Jersey northwestward over the Lake region, and in all districts west of the Mississippi River, save from eastern Montana southward to central New Mexico and Arizona, and at stations along the immediate Pacific coast north of the thirty-fifth parallel. The lowest maximum temperature reported was 64°, at Tatoosh Island, Wash.; at Eureka, Cal., the maximum temperature was 65°; and the maximum readings were below 80° along the immediate Pacific coast north of San Francisco, Cal., and in eastern and southeastern New England. The reports of United States Army post surgeons and state weather service and voluntary observers show the following maximum temperatures in states and territories where temperature rising to, or above, 100° was reported: Collyer, Kans., 120°; Volcano Springs, Cal., 118°; Texas Hill, Ariz., 114°; El Dorado Canyon, Nev., 109°; Bennet, Colo., Ansley and Thedford, Nebr., 108°; Tipton, Pa., and Fort Hancock, Tex., 107°; Lead Hill Ark., Glenwood, Iowa, and Eldon, Mo., 106°; Athens (2) and Millen, Ga., 105°; East Peoria and Pontiac, Ill., Huntingburgh and Muncie, Ind., Columbus and Water Valley, Miss., Glendive, Mont., Fort Selden, N. Mex., Dyersburgh, Tenn., Saint George, Utah, and Fort Fetterman, Wyo., 104°; Evergreen, Ala., Grant's Pass, Oregon, Cheraw, S. C., and Grantsburgh, Wis., 103°; Guthrie, Ind. T., Chapel Hill, N. C., Fort Bennett, S. Dak., Nottaway C. H., Va., and North Yakima, Wash., 102°; Lewiston, Idaho, Murray, Ky., Cameron and Mandeville, La., and Wapakoneta, Ohio, 101°; Bangor, Mich., and Grand Meadow, Minn., 100°.

At the following named stations of the Signal Service the maximum temperature for the current month was as high or higher than previously reported for June: Wilmington, N. C., twenty years record, 100°, the same as maximum of 1880; Atlanta, Ga., twelve years record, 98°, 1° above maximum of 1887; Palestine, Tex., nine years record, 94°, 3° above maximum of 1889; Indianapolis, Ind., twenty years record, 97°, 1° above maximum of 1888; Detroit, Mich., twenty years record, 94°, the same as maximum of 1888; Escanaba, Mich., twenty years record, 96°, 8° above maximum of 1874; Port Huron, Mich., sixteen years record, 94°, 1° above maximum of 1888; Milwaukee, Wis., twenty years record, 95°, 1° above maximum of two or more preceding years; Saint Vincent, Minn., ten years record, 94°, 1° above maximum of 1887; Saint Paul, Minn., twenty years record, 94°, the same as maximum of 1874; Davenport, Iowa, twenty years record, 98°, 1° above maximum of 1887; Keokuk, Iowa, nineteen years record, 98°, 2° above maximum of 1873; Cairo, Ill., nineteen years record, 96°, the same as maximum of 1887; Springfield, Ill., eleven years record, 97°, 1° above maximum of 1887; Saint Louis, Mo., twenty years record, 98°, the same as maximum of 1881; Omaha, Nebr., twenty years record, 98°, the same as maximum of 1881; Dodge City, Kans., sixteen years record, 102°, the same as maximum of 1880; Los Angeles, Cal., thirteen years record, 105°, 1° above maximum of 1879. The highest temperature ever reported for any month at a regular station of the Signal Service was 119° at Fort McDowell, Ariz., in June, 1887, and at Phœnix, Ariz., in June, 1883. Among extremely high temperatures reported for June of preceding years by United States Army post surgeons and voluntary observers are: 121° at Fort Miller, Cal., in 1853; 120° at Fort McRae, N. Mex., in 1873; 120° at Volcano Springs, Cal., in 1889; and 119° at Fort Mojave, Ariz., in 1876.

The lowest temperature reported by regular stations of the Signal Service was 30°, at Fort Maginnis, Mont., Cheyenne and Fort McKinney, Wyo., Carson City, Nev., and Taylor's Ranch, Utah, and the minimum temperature fell below 40° over northern New England, in the Saint Lawrence Valley, over a greater part of Michigan, at Saint Vincent, Minn., over a greater part of the plateau region, and on the Pacific coast north of the mouth of the Columbia River. The highest minimum temperature, 71°, was reported at Jupiter, Fla., and the minimum temperature was 70° at Key West and Pensacola, Fla. The reports of United States Army post surgeons and state weather service and voluntary observers show the following minimum temperatures in states and territories where temperature falling to, or below, 32° was reported: Breckenridge, Colo., 12°; Alma Colo., 21°; Alliance, Nebr., 32°; Chama, N. Mex., 23°; Bonanza and Era, Idaho, Ely and Ruby Hill, Nev., 24°; Fort D. A. Russell, Wyo., 25°; Berlin Falls, N. H., Jordan Valley, Oregon, and Mount Pleasant, Utah, 26°; Weymouth, Ohio, and Christiansburgh, Va., 37°; Newhall, Cal., Fort Logan, Mont., Aberdeen, S. Dak., and Fort Canby, Wash., 30°; Evart and Roscommon, Mich., and Constableville, N. Y., 31°. At the following-named stations the minimum temperature for the current month was as low or lower than previously reported for June: Rio Grande City, Tex., fourteen years record, 62°, the same as minimum of 1877; Denver, Colo., nineteen years record, 37°, the same as minimum of two or more preceding years; Tatoosh Island, Wash., six years record, 34°, 11° below minimum of 1886; Red Bluff, Cal., thirteen years record, 47°, the same as minimum of 1880; Sacramento, Cal., thirteen years record, 44°, 3° below minimum of 1887. In the south Atlantic states the lowest temperatures previously noted for June occurred generally in 1884 and 1889; in the east Gulf states and the Ohio Valley and Tennessee, in 1889; in the Rio Grande Valley, in 1877; and in the extreme northwest, in 1883 and 1888; elsewhere the periods of occurrence were irregular.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges of temperature occurred in the Rocky Mountain and plateau regions, where, at stations, they equalled or exceeded 60°, whence they decreased eastward to less than 30° on the coast of southeastern New England, southeastward to less than 20° over extreme southern Florida, southward to less than 30° on the west Gulf coast, to less than 40° in the lower Rio Grande valley and at stations in southeastern Arizona, southwestward to less than 50° on the extreme south Pacific coast, and westward to less than 30° on the immediate Pacific coast north of the fortieth parallel.

The following are some of the extreme monthly ranges:

Greatest.	°	Least.	°
Taylor's Ranch, Utah	63.0	Key West, Fla	19.0
Baker City, Oregon	60.0	Eureka, Cal	20.0
Fort Thomas, Ariz	60.0	Fort Canby, Wash	22.0
Port Huron, Mich	54.0	Nantucket, Mass	26.0

FROST.

The following is a summary of reports of damaging frost made by regular and voluntary observers of the Signal Service: On the 3d, 12th, and 13th frost caused some injury to plants at Beaver, Idaho. On the 4th frost killed tender vegetables and plum and apricot blossoms at Mount Pleasant, Utah. In Colorado from the 4th to the 9th low temperature prevailed; frost was reported at stations east of the mountains, and in Larimer and Weld counties slight damage was caused to garden vegetables, grape vines, etc. On the 8th frost injurious to grain was reported at North Hammond, N. Y. On the 8th frost was reported in several sections of Michigan. On the 10th frost killed tender vegetables at Show Low, Ariz. On the 14th frost injured vegetation and ice formed one-half inch thick at Owen, Wyo. On the 16th killing frost occurred at Fort Washakie, Wyo. As compared with the average date of

last killing frost in the respective districts, the frost reported in Idaho and Wyoming on the 13th and 16th, respectively, was about one month late, the frost of the 4th in Utah was three to four weeks late, the frost of the 4th to 9th in Colorado was three to five weeks late, and the frost of the 8th in New York and Michigan, and of the 10th in Arizona, was five to six weeks late. For the current month no frost was reported in New England south of central New Hampshire; in the middle Atlantic states frosts occurred at the more elevated stations as far south as extreme northeastern West Virginia on the 8th; in the central valleys frost was reported in south-central Illinois on the 13th, and in north-central Kansas on the 3d; in the Rocky Mountain and plateau regions frost was reported as far south as east-central Arizona on the 4th to 7th, and 10th; on the Pacific coast frost was reported in the Sacramento Valley in about latitude north 39° on the 1st, 2d, 3d, 18th, and 20th. Compared with the preceding month the southern limit of frost for June, 1890, was about five degrees farther north in the Atlantic coast states, about four degrees farther north in the central valleys, about one degree farther south in the plateau region, and about five degrees farther north on the Pacific coast.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for June, 1890:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Boston, Mass	67.0	58.0	9.0	61.4	64.2
Canby, Fort, Wash	63.5	56.3	7.2	60.4	55.8
Charleston, S. C	87.0	77.8	9.2	82.8	82.2
Eastport, Me	48.0	44.8	3.2	45.9	54.0
Galveston, Tex	87.0	74.5	12.5	82.8	80.3
Key West, Fla	89.5	83.0	6.5	86.2	81.4
Portland, Oregon	63.6	57.0	6.6	60.2	61.8

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for June, 1890, as determined from the reports of nearly 2,000 stations, is exhibited on chart iii. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The heaviest precipitation reported for June, 1890, was 16.53, at Fayette, Iowa, and the monthly precipitation exceeded 10 inches on the west-central coast of Fla., in northern Ill., south-central Ind., northeastern, north-central, and west-central Iowa, southern and central La., southwestern Minn., the adjoining parts of N. Dak. and S. Dak., and in northeastern Wis. In the interior of Cal. south of the Sacramento Valley, and thence eastward over the Colorado and lower Gila valleys, no precipitation was reported, and over the eastern part of the plateau region from southwestern N. Mex. northward to southern Wyo., and thence westward over the middle and the southern part of the northern plateau region to the Pacific coast between the thirty-seventh and fortieth parallels, and from central Tex. northward to south-central Ind. T., the monthly precipitation was less than 0.50.

The precipitation was in excess of the average for the month on the north Pacific coast, within an area extending from the Saskatchewan Valley southeastward over Wis. and northern Ill., in south-central N. Mex. and extreme western Tex., in the lower Mississippi valley, on the west Gulf coast, at New York City, Wood's Holl, Mass., Portland, Me., from Ontario north of the lower lakes southwestward over the middle Ohio valley, at Quebec, Yarmouth, N. S., and in Cape Breton and Prince Edward islands; elsewhere the precipitation was deficient. The greatest excesses in precipitation occurred in adjoining parts of Iowa, Ill., and Wis., and in central N. Dak., where they exceeded 4.00, and the most marked deficiencies were noted over eastern Kans., and thence southwestward over central Ind. T., in extreme western Fla., from the S. C. coast northward to south-central N. C., and at Washington City, where they were more than 4.00. Considered by districts the average percentage of the normal in districts where the precipitation was in excess was about as follows: extreme northwest, 179 per cent.; north Pacific coast, 135 per cent.; west Gulf states, 130 per cent.; New England and the upper Mississippi valley, 102 per cent. In districts where the precipitation was deficient the percentages of the normal were about as follows: south Pacific coast, 9 per cent.; middle Pacific coast and southeastern slope of the Rocky Mountains, 19 per cent.; southern and middle plateau regions, 22 per cent.; south Atlantic states, 45 per cent.; middle-eastern slope of the Rocky Mountains, 59 per cent.; middle Atlantic states, 66 per cent.; east Gulf states and northeastern slope of the Rocky Mountains, 76 per cent.; northern plateau region, 79 per cent.; Key West, Fla., 80 per cent.; Rio Grande Valley, 83 per cent.; upper lake region, 87 per cent.; lower lake region and Ohio Valley and Tennessee, 96 per cent.; and Missouri Valley, 98 per cent.

The table of miscellaneous meteorological data for regular stations of the Signal Service and the table of deviations from the average precipitation for certain stations, as reported by voluntary observers, show that at the following-named places the precipitation for the current month was the heaviest reported for June during the respective periods of observation: Lexington and Louisville, Ky., Vevay, Ind., Monticello, Logan, Dubuque, and Cresco, Iowa, La Crosse, Wis., Fort Sully and Huron, S. Dak., Bismarck, N. Dak., and Port Angeles, Wash. At Charlotte, N. C., Charleston, S. C., Atlanta, Ga., Pensacola, Fla., Lead Hill, Ark., Nashville, Tenn., Cairo, Ill., Denver, Colo., Wellington, Kans., Abilene, Tex., Fort Apache, Fort Verde, Whipple Barracks, and Yuma, Ariz., Keeler, Sacramento, and San Diego, Cal., the precipitation was the least ever reported for June, and at the stations named in Arizona and California, save at Fort Apache, Ariz., and Keeler, Cal., no precipitation was reported, and an entire absence of precipitation in June has been reported for 2 or more preceding years.

In June of preceding years the heaviest precipitation was reported generally in the Rio Grande Valley in 1887; in the extreme northwest and on the north Pacific coast in 1888; on the southeastern slope of the Rocky Mountains in 1878 and 1889; in the middle plateau region in 1885 and 1889; in the northern plateau region and on the middle and south Pacific coasts in 1884 and 1888; and the least precipitation for June was generally reported in New England in 1873 and 1888; in the middle Atlantic states north of Virginia in 1873; in the west Gulf states in 1882; and in the extreme northwest in 1887 and 1889; elsewhere the periods of greatest and least precipitation in June were irregular.

For the period January to June, 1890, inclusive, the precipitation in the west Gulf states, the Ohio Valley and Tennessee, and the lower lake region averaged about one-fourth greater than the normal, while in the south Atlantic states, at Key West, Fla., in the east Gulf states, in the Missouri Valley, on the northeastern and middle-eastern slopes of the Rocky